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SPECIFICATION FOR AMORCES (PAPER CAPS FOR TOY PISTOL)

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 3 *June* 1986

AMENDMENT NO. 1 DECEMBER 1995
TO
IS 11483 : 1985 SPECIFICATION FOR AMORCES (PAPER CAPS FOR TOY PISTOLS)

(*Page* 5, *clauses* **5.1.1** *and* **5.1.2**) — Substitute the following for the existing clauses and renumber the subsequent clause:

'**5.1.1** Both the types of amorces, that is, dot caps and roll caps shall be packed in 30 numbers in round cardboard box of dimensions as agreed to between the purchaser and the manufacturer.'

(*Page* 6, *clause* A-1.1, *line* 1) — Substitute '1 000' *for* '100'.

(*Page* 6, *clause* A-2, *line* 3) — Substitute '1 000' *for* '100'.

(*Pages* 7 *and* 8, *clause* **B-3.1**) — Substitute the following for the existing clause:

'**B-3.1** Take 1 000 dots and slightly wet by water. With the help of a needle separate the two layers and scrap out the pyrotechnic mixture on a tared watch glass. Keep in a desiccator for 30 minutes and weigh. Transfer the weighed pyrotechnic mixture into a wet thimble/Whatman filter paper No. 40 and place it into the extraction flask. Assemble the extraction apparatus on a hot plate and adjust at the rate of two or three drops per second. Continue the extraction for atleast 5 h or until the completion of the extraction.'

(CHD 026)

Reprography Unit, BIS, New Delhi, India

Indian Standard

SPECIFICATION FOR AMORCES (PAPER CAPS FOR TOY PISTOL)

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(*Continued on page* 2)

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SPECIFICATION FOR
AMORCES (PAPER CAPS FOR TOY PISTOL)

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 28 November 1985, after the draft finalized by the Explosives and Pyrotechnics Sectional Committee had been approved by the Chemical Division Council.

0.2 The amorces are one of the pyrotechnic materials used for entertainment purpose by the children. They produce a clear and distinct sound when fired on toy pistols, guns or any such entertainment devices.

0.3 The Committee responsible for the formulation of this standard while finalizing this standard felt that it was necessary to incorporate a test for checking the sensitivity of the amorces. The amorces should not be oversensitive to explode during handling. It was decided to collect data for drop test in this regard for inclusion of the requirement in the standard at a later stage.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for amorces known as paper caps used on toy pistols, guns or any such entertainment devices.

2. TERMINOLOGY

2.1 For the purpose of this standard, the following definitions shall apply.

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*Rules for rounding off numerical values (*revised*).

2.1.1 *Amorces or Paper Caps* — They shall denote the small spots of an impact and friction sensitive pyrotechnic composition placed and fixed between two layers of paper in the form of discs in the case of dot caps, or strips in the case of roll caps, for use on toy pistols, guns or any such entertainment devices. When fired on such toy pistols, guns or devices they produce a clear and distinct sound.

2.1.2 *Composite Paper*

2.1.2.1 In the case of dot caps, the composite paper consists of two layers of red coloured paper of approximately 50 to 55 g/m^2.

2.1.2.2 In the case of roll caps, the composite paper consists of a layer of white coloured paper of approximately 110 to 115 g/m^2 and a layer of red coloured tissue of paper of 25 to 30 g/m^2.

3. TYPES

3.1 The material shall be of the following two types:

Type 1 (Dot Caps) — A single, fixed spot of the pyrotechnic composition encased within the composite paper in the shape of small circular discs.

Type 2 (Roll Caps) — A series of fixed spots of the pyrotechnic composition at regular intervals encased within the composite paper in the shape of linear paper strips.

4. REQUIREMENTS

4.1 Manufacture — The pyrotechnic composition of potassium chlorate, red phosphorus, glass powder, sulphur (free of acid) and precipitated chalk, gum or dextrin shall be fixed centrally within the composite paper. They may be cut into small discs or linear strips for dot and roll caps, respectively.

4.1.1 Not more than 4·5 g/1 000 dots of the pyrotechnic mixture shall be present when tested according to the method prescribed in Appendix A.

4.1.2 Amorphous phosphorus in the mixture shall not exceed 0·65 g/ 1 000 dots. When tested according to the method prescribed in Appendix B.

4.1.3 In case of dot amorces, the pyrotechnic mixture shall be placed centrally between small circular composite papers of 8 ±1 mm diameter.

4.1.4 In case of roll amorces, 30 or 50 spots of the pyrotechnic mixture shall be placed centrally and equidistant between the composite paper strips of 250 ± 5 mm length and 8 ± 1 mm width. The strips shall have a minimum of 1·5 cm blank on both ends.

4.1.5 The number of defective amorces, such as blank amorces and amorces where mixture is visible at the edges shall not exceed 2 percent of the test sample.

4.2 Functional Requirement — A clear and distinct sound of 52 to 57 decibels and 46 to 48 decibels shall result when fired with a toy pistol in in an open atmosphere and measured with a sound level meter at a distance of 0·5 metre and 1 metre, respectively. For closed atmosphere the value shall be 53 to 57 for 0·5 metre and 46 to 51 for 1 metre.

5. PACKING AND MARKING

5.1 Packing

5.1.1 *Dot Caps* — The dot caps shall be packed in 30 to 50 numbers. In case of packing of 30, a round cardboard box of 20 mm dia and 8 mm height shall be used. In case of 50 dot caps, a round cardboard box of 25 mm dia and 9 mm height shall be used.

5.1.2 *Roll Caps* — A strip of roll caps of 30 or 50 shall be packed in a round cardboard box of 20 mm dia and 8 mm height.

5.1.3 Ten such pill boxes shall be wrapped in packets of suitable paper wrapper. Ten such packets shall be packed in a cardboard carton. Fifty or hundred such cartons shall be packed in wooden or strong millboard boxes (*see* IS : 2617-1967*).

5.2 Marking — The packages shall be marked wilh the following information:

a) Name of the material;

b) Number of cartons in a package;

c) Name of the manufacturer and his registered trade-mark, if any; and

d) Identification number.

---

*Specification for millboard, grey board and strawboard (*first revision*).

5.2.1 The boxes may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

5.2.2 The following warning shall appear on label of the packing containing the pill boxes and also on the wooden or millboard boxes:

> *CAUTION* — Impact and friction sensitive. Do not throw or allow the box to fall. Amorces shall be fired with arms extended away from the body and shall be more than 30 cm away from the ear.

5.2.3 The marking and packing shall further conform to the *Explosives Rules*, 1983, and subject to the approval of the Chief Controller of Explosives, Nagpur.

6. SAMPLING

6.1 The method of taking representative samples of the material and the criteria for its conformity to this specification shall be as prescribed in Appendix C.

APPENDIX A

(*Clause* 4.1.1)

DETERMINATION OF PYROTECHNIC MIXTURE

A-1. PROCEDURE

A-1.1 Take 100 dots and slightly wet by water. With the help of a needle, separate the two paper layers. Scrap out the pyrotechnic mixture on a tared watch glass. Keep in a desiccator for 30 minutes and weigh.

A-2. CALCULATION

Mass of 1 000 dots = 10 M

where

M = mass in g of 100 dots obtained as above.

APPENDIX B

(*Clause* 4.1.2)

DETERMINATION OF AMORPHOUS PHOSPHORUS

B-0. PRINCIPLE

B-0.1 The amount of amorphous phosphorus in the pyrotechnic composition is determined by removing all other constituents by the solvent extraction method when the desired component is left behind as a residue.

B-1. APPARATUS

B-1.1 Extraction Thimble

B-1.2 Extractor (*Soxhlet or equivalent*)

B-1.3 Hot Plate

B-1.4 Extraction Flask

B-1.5 Condenser

B-1.6 Vacuum desiccator maintained at a pressure of approximately 25 mm of mercury over a desiccant.

B-2. REAGENTS

B-2.1 Carbon Disulphide

B-2.2 Manganous Sulphate — 10 percent (m/v). Weigh 10 g of manganous sulphate, dissolve in minimum amount of water and dilute to 100 ml.

B-2.3 Orthophosphoric Acid

B-2.4 Iodine Crystals

B-2.5 Citro-molybdate

B-2.6 Quinoline Hydrochloride

B-3. EXTRACTION

B-3.1 Transfer an accurately weighed portion of the pyrotechnic into a wet thimble/Whatman filter paper No. 40 and place it into the extraction flask. Assemble the extraction apparatus on a hot plate and adjust at the rate of two or three drops per second. Continue the extraction for atleast 5 h or until the completion of the extraction.

B-3.2 For finding the completion of extraction, draw one or two drops of the solvent from the extractor. Transfer the drops into a clean test tube and add a few drops of saturated manganous sulphate (10 percent *m/v*) and two drops of orthophosphoric acid and boil. Appearance of a violet colouration indicates presence of chlorates. In such a case, repeat extraction till absence of chlorate is confirmed (*see* **B-5**).

B-4. DETERMINATION OF PHOSPHOROUS (QUINOLINE-PHOSPHOMOLYBDATE METHOD)

B-4.1 Test Solution — Remove the thimble or Whatman filter paper from the extractor and place it in a 500-ml flask, add few ml of distilled water and 1-2 g of pure iodine crystals to dissolve the material along with the disintegrating paper. Heat the flask gently and carefully add 20-25 ml of concentrated nitric acid. After dissolution of phosphorus iodide, add more nitric acid and boil gently until all iodine has been expelled. Dilute with water and filter into 500-ml measuring flask. Wash the funnel and collect the washings also. Make up to the mark with water.

B-4.2 Procedure — Take sufficient volume of the test solution in a 250-ml conical flask (*see* Note 1). Add 50 ml of citro-molybdate reagent and boil. Add 5 drops of quinoline hydrochloride solution with stirring. Again heat to boiling and add quinoline hydrochloride solution drop by drop with constant stirring until 2 ml have been added. To the gently boiling solution add the quinoline hydrochloride solution, a few millilitres at a time, with constant stirring until a total of 60 ml has been added. A coarsely crystalline precipitate is produced. Allow to stand on the hot plate for 15 minutes and then cool to room temperature. Filter through a filter paper or pulp pad employing suction and wash the precipitate with cold water until free from acid. Transfer the filter pad and the precipitate to the original flask and rinse the funnel with water into the flask. Dilute to about 100 ml with water. Stopper the flask and shake it vigorously till the pulp and the precipitate get completely disintegrated. Remove the stopper and wash it with water collecting the washings into the flask. From a burette add 50 ml of 0·5 N standard sodium hydroxide solution with continuous stirring. Shake vigorously to dissolve all the precipitate (*see* Note 2). Add 1 ml of mixed indicator solution and titrate the excess of sodium hydroxide solution with 0·5 N hydrochloric acid until the colour changes from violet to green-blue and then very sharply to yellow. Carry out a blank determination using all reagents without the sample solution and using exactly 0·1 N standard sodium hydroxide and 0·1 N standard hydrochloric acid instead of 0·5 N acid and 0·5 N alkali.

NOTE 1 — The volume shall not exceed 100 ml as any reduction in the concentration of hydrochloric acid may lead to the formation of a cream coloured precipitate of the wrong composition. To avoid such contamination in the presence of sulphates, a higher concentration of hydrochloric acid is necessary.

NOTE 2 — Examine the disintegrated paper pulp carefully for specks of undissolved precipitate which sometimes dissolve in excess of sodium hydroxide with difficulty.

B-4.3 Calculation

Phosphate (as P), percent by mass $= 0.05\,965 \dfrac{(V_1 - V_2) - (V_3 - V_4)/5}{M}$

Phosphate (as P_2O_5) percent by mass $= 0.1\,366 \dfrac{(V_1 - V_2) - (V_3 - V_4)/5}{M}$

where

V_1 = volume in ml of 0·5 N sodium hydroxide used with sample,

V_2 = volume in ml of 0·5 N hydrochloric acid used with sample,

V_3 = volume in ml of 0·1 N sodium hydroxide used with blank,

V_4 = volume in ml of 0·1 N hydrochloric acid used with blank, and

M = mass in g of the material.

B-4.3.1 The amount of phosphate percent by mass as P_2O_5 may also be calculated by using the formula:

1 ml 0·5 N NaOH = 1·366 mg P_2O_5

B-5. DETERMINATION OF CHLORATE

B-5.1 Reagents

B-5.1.1 *Ferrous Sulphate* — Take 7 g of ferrous sulphate in 250-ml flask. Add about 10 ml of concentrated sulphuric acid and shake well. Make up to the mark.

B-5.1.2 *Manganous Sulphate* — 10 percent (*m/v*). Weigh 10 g of manganous sulphate, dissolve in minimum amount of water and dilute to 100 ml.

B-5.1.3 *Potassium Permanganate* — 0·1 N.

B-5.1.4 *Phosphoric Acid* — 85 percent.

B-5.2 Procedure — Pipette and 20 ml of the made up solution to a 250-ml conical flask. Add 35 ml of freshly prepared ferrous sulphate solution and 10 ml of dilute sulphuric acid. Boil the contents for 15 minutes and then cool under tap water. Add 10 ml of 10 percent manganous solution. Shake it well and add 2 ml of phosphoric acid. Titrate the total content with potassium permanganate solution. Appearance of pale pink colour indicates the end point. Run a blank and calculate the percentage of chlorate in the solution.

B-5.3 Calculation

$$\text{Potassium chlorate, percent} = \frac{2{\cdot}043 \times (V_2 - V_1) \times N}{M}$$

where

V_1 = volume in ml of potassium permanganate consumed by excess of reducing agent,

V_2 = volume in ml of potassium permanganate consumed in the blank,

N = normality of potassium permanganate, and

M = mass in g of the material taken.

APPENDIX C

(*Clause* 6.1)

SAMPLING OF AMORCES

C-1. SCALE OF SAMPLING

C-1.1 *Lot* — All the millboard boxes in a consignment and belonging to the same batch of manufacture shall constitute a lot.

C-1.2 Unless otherwise agreed to between the buyer and seller the number of millboard boxes to be selected shall depend upon the size of the lot and shall be in accordance with Table 1.

C-1.3 The sample millboard boxes shall be selected at random from the lot. In order to ensure the randomness of selection, procedure given in IS : 4905-1968* may be followed.

---

*Methods of random sampling.

TABLE 1 NUMBER OF MILLBOARD BOXES TO BE SELECTED FROM A LOT

(*Clause* C-1.2)

LOT SIZE (1)	SAMPLE SIZE (2)
Up to 15	1
16 to 50	2
51 and above	3

C-2. NUMBER OF TESTS

C-2.1 From each box, 10 cartons shall be selected and from each carton, one wrapper box shall be selected and from each wrapper box, one pill box shall be selected.

C-2.2 In each pill box all the amorces shall be visually checked for defects given in **4.1.5.**

C-2.3 From each pill box one dot amorces shall be checked for diameter. In case of roll caps the roll from each pill box shall be checked for dimensional requirements and the blank lengths on both ends.

C-2.4 All the pill boxes shall be opened and all the dot amorces shall be collected in a tray and from there 30 amorces shall be selected and subjected to functional requirement as given in **4.2.** In case of roll caps all the rolls shall be combined and one roll shall be selected at random and subjected to fuctional requirement as given in **4.2.**

C-2.5 Required number of dot amorces or roll amorces shall be taken for the test as given in **4.1.1.**

C-3. CRITERIA FOR CONFORMITY

C-3.1 The lot shall be declared as conforming to the specification of this standard if the following conditions are satisfied.

C-3.1.1 The number of defective amorces as inspected in **C-2.2** does not exceed the number given in **4.1.5.**

C-3.1.2 The dimensional requirements are satisfied for all the dot amorces tested from different pill boxes or in case of roll caps all the rolls tested from different pill boxes.

C-3.1.3 All the tests for functional requirements are satisfied.

C-3.1.4 Requirement for **4.1.1** is satisfied.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	Unit	Symbol	Definition
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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